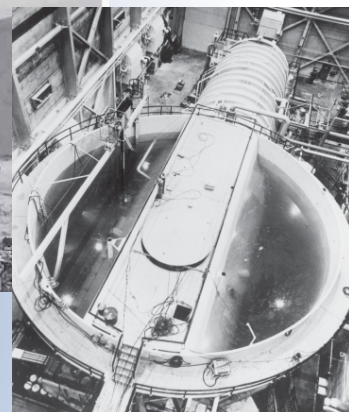




*From its early days as a Naval gunnery range, and with more recent missions – such as nuclear nonproliferation and critical infrastructure protection – INL has played a major role in the nation's security.*



## National and Homeland Security

Since its inception in 1949, Idaho National Laboratory has created products and developed solutions that are saving lives from the home front to the battlefield.

During World War II, INL was a proving ground for the U.S. Navy's long-range artillery weapons. In the early 1950s, the laboratory designed and operated the Nautilus S1W, the prototype of the Navy's first nuclear submarine. In recent times, INL has become the lead manufacturer

of heavy armor for the Army's M1-A1 Abrams tanks, developed systems for detecting explosives and nuclear materials in cargo trucks and shipping containers, and created a Critical Infrastructure Test Range where the nation's infrastructure systems can be tested and strengthened against acts of terrorism. For more than 55 years, Idaho National Laboratory has worked to improve the security of our country.

Today, the laboratory's national and homeland

security objectives continue. Recent national and international events – from the War on Terrorism to the threat of nuclear weapons – have led INL to formulate four national and homeland security mission areas. Within each of these areas, INL leverages its scientific expertise, engineering discipline, and unique infrastructure assets to develop solutions to meet the daily challenges faced by our military, law enforcement,

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National Security



**INL's Pulsed Photonuclear Assessment Technology can detect concealed nuclear materials hidden in shipping containers.**



**INL nonproliferation experts work to convert high-enriched uranium reactor fuel into low-enriched fuel that is not usable for nuclear weapons.**



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and homeland security communities.

### **Critical Infrastructure Protection**

Utilizing our Critical Infrastructure Test Range and our integrated capabilities and expertise in cyber security, process control systems, and telecommunications, INL is uniquely positioned to strengthen and improve the defenses of our nation's critical resources. Our 890-square-mile Test Range allows for full-scale testing and analysis of systems that operate telecommunication networks, the electric power grid, and chemical facilities,

**INL's Critical Infrastructure Test Range includes a self-contained power grid, pipeline system and wireless test bed for securing the nation's infrastructures.**

among others. It is an ideal location for validating and improving infrastructure systems as they are challenged by age, natural disasters, or terrorism.

Our wireless and telecommunications test capabilities include several cellular and fiber optic

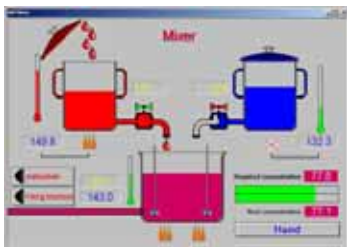
communications towers complete with next-generation components, and little or no radio-frequency interference. Additionally, INL is authorized by the National Telecommunications Information Administration to operate as an experimental radio station, allowing us to develop wireless technologies to improve communications security, networking, and reliability for private utilities and government customers.

Recently, researchers partnered with the Department of Homeland Security, private utility industries, and universities to develop risk and vulnerability assessment technologies to mitigate the threats posed by cyber attacks on computer control systems.

INL scientists and engineers are also working jointly with private electric utilities to increase cyber security standards and technologies within Supervisory Control and Data Acquisition Systems. Using INL's expertise and utility-scale, transmission and distribution systems,







researchers are analyzing and testing both national and international vendor systems and providing real-time research results.

### **Nuclear Nonproliferation**

Building on INL's nuclear mission and legacy in reactor operation and design, our scientists and engineers are developing technologies,



systems, and training courses to secure the nuclear fuel cycle and prevent the proliferation of weapons of mass destruction.

Working with DOE's National Nuclear Security Administration, INL scientists are heavily involved in reducing the global threat of legacy nuclear materials and facilities through the development and deployment of proliferation-resistant nuclear fuels for advanced research reactors. We also work to dismantle and secure nuclear and radiological materials and production facilities that pose a threat to the United States and to the international community.

INL researchers – with expertise in nuclear signatures and detection – have applied their knowledge to the development of active interrogation technologies such as the Pulsed Photo-nuclear Assessment System, which scans shipping containers for concealed nuclear materials encased in lead. Researchers also examine nuclear and radiological materials to understand their origin and potential uses.

As advanced nuclear energy systems expand globally, our scientists will continue to perform research and development to safeguard present and future nuclear energy systems, processes, and materials. At the same time, we provide comprehensive coursework and field-training programs to instruct first responders and consequence management teams to handle radiological emergencies.

### **Defense Systems and Technology**

Safeguarding our soldiers involved in global conflicts requires innovative solutions

*Using INL's expertise and full-scale, independent grid, researchers are developing technologies to secure the computer-aided control systems that operate our nation's electricity, water and telecommunication systems.*

*INL energy security researchers are developing a transmission line sensor that can remotely detect tampering on high-voltage power lines.*

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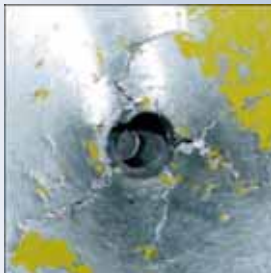
**For more information:**

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www.inl.gov/national  
security

**A U.S. Department of Energy  
National Laboratory**



**INL performs research,  
development and testing  
on next-generation  
lightweight armor for  
equipment and personnel.**



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that meet and exceed the challenges faced in modern warfare. INL has a long history of supporting our service men and women both at home and abroad. We work with all branches of the U.S. military to develop technologies that protect our soldiers and citizens.

For more than a decade, INL has been the sole producer of heavy armor for the Army's M1-A1 Abrams tank fleet. Today, we continue our work in this area, as we perform research, development, and testing on next-generation lightweight armor for equipment and personnel. Researchers are also working to develop low-cost, transparent armor for vehicles and buildings.

INL engineers have developed technologies for the assessment of chemical weapons,

including projects in mobile and fixed chemical munitions assessment such as the Mobile Munitions Assessment System, which characterizes nonstockpile chemical weapons material for compliance with the Chemical Weapons Convention, and the portable isotopic neutron spectroscopy (PINS) system, which is routinely used by our military to identify the contents of unexploded munitions.

Our Test Range supports trace and bulk explosives detection, testing, and blast effects modeling, while our Live Fire Range allows researchers to calculate the impacts of small-arms fire and rocket-propelled grenades. Our scientists have developed the award-winning Idaho Explosives Detection System for the detection of standoff explosive devices, which can be smuggled in cargo trucks entering military bases and parking garages. We are also working with the Federal Aviation Administration to develop technologies for detecting trace amounts of explosives at airports.

Using our dedicated 1,000-foot runway and mobile

**INL's award-winning Explosives Detection System identifies smuggled explosive materials in cargo trucks entering military bases, government facilities and parking garages.**

ground station, INL engineers are testing and fitting lightweight, low-cost unmanned aerial and ground vehicles with sensors to perform surveillance over large infrastructures such as power and gas pipelines or during emergency events such as forest fires.

### **Special Programs**

INL researchers perform essential work for customers within the Department of Defense and other federal agencies.

INL recently developed a Change Detection System that can identify subtle changes in digital photographs taken minutes or weeks apart. This award-winning technology has applications in surveillance, but is also being looked at as a medical tool for analyzing changes in MRIs and X-rays. Additionally, researchers have developed a solid composite polymer for batteries that allows devices such as GPS units and laptops to run for longer periods of time between charges.

### **Innovative Solutions**

For more than a half century, Idaho National Laboratory scientists and engineers have innovatively addressed some of the country's most pressing security needs. As new challenges arise, INL will continue to be called on to provide the solutions and tools needed to protect our country and its citizens.